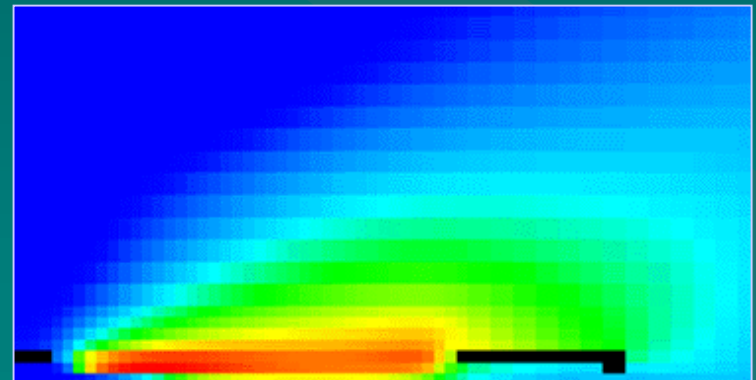
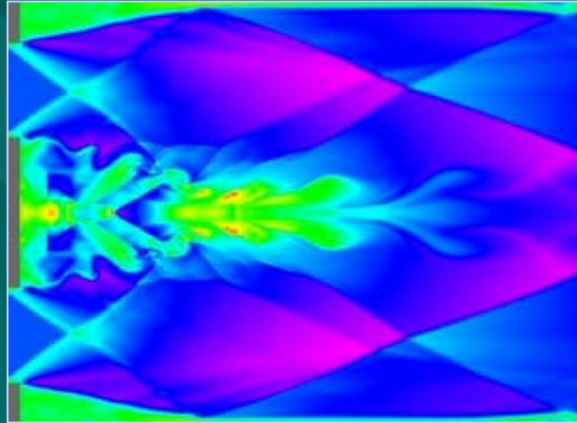


# Modeling and Simulation for Emergency Response Workshop

## Opening Remarks

March 4, 2003

Dale Hall  
Director, Manufacturing  
Engineering Laboratory



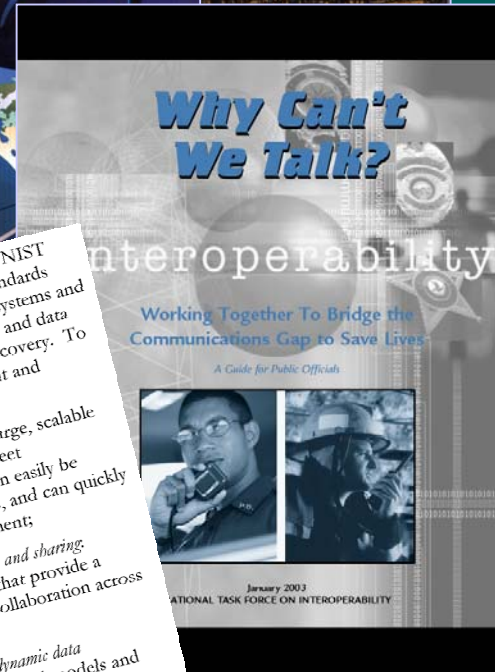
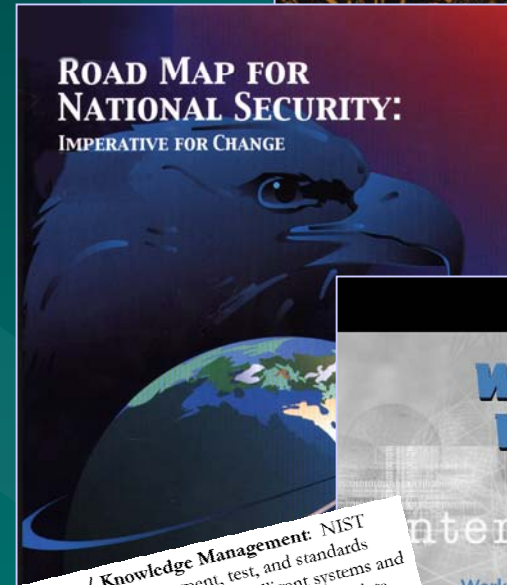
# Emergency Response Wake-Up Call

- Terrorist attack of 9 -11
- Natural disasters
  - Hurricanes in the southeast
  - Floods in the mid-west
  - Forest fires in the west
- Man-made events
  - Exxon Valdez tanker oil spills
  - Train derailment chemical spills
  - Refinery and chemical plant fires
  - Oklahoma City bombing
  - Anthrax mailings
  - Washington DC sniper attacks



# Recent Calls for Action

- “Making the Nation Safer” - NRC Report
- “Road Map for National Security” - US Commission on National Security
- National Task Force on Interoperability January 2003 report: “Why Can’t We Talk?”
- Broad Agency Announcements
- NIST 2010 Strategic Plan identified Homeland Security as one of 4 Strategic Focus Areas
  - Help build national measurement infrastructure
  - Provide measurements, standards, and technical advice

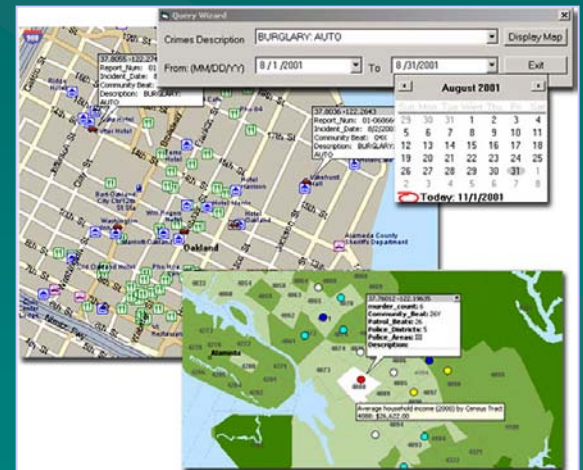
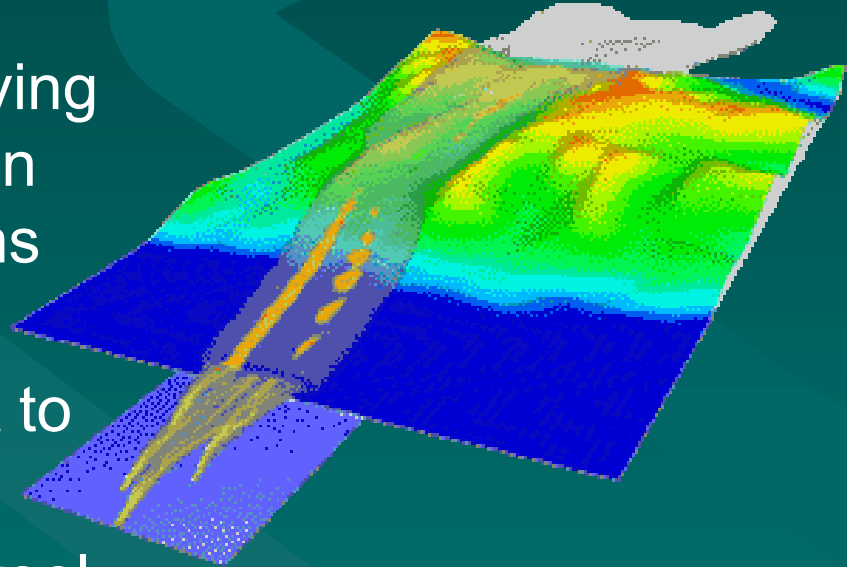


**Information / Knowledge Management:** NIST will develop new measurement, test, and standards tools that enable more effective intelligent systems and control processes, improve interoperability and data exchange, and enhance innovation and discovery. To this end, NIST will focus on measurement and standards needs in three areas:

- *Intelligent interconnected systems:* Large, scalable interconnected systems that meet performance requirements, can easily be integrated with other systems, and can quickly adapt in a dynamic environment;
- *Interoperability for collaboration and sharing:* Interoperability standards that provide a common foundation for collaboration across technical domains; and
- *Virtual measurements and dynamic data infrastructure:* Computer-based models and research methods that can complement experimental measurements.

# Why use Simulation for Emergency Response?

- Indispensable problem-solving methodology for the solution of many real-world problems
- May be the only feasible approach when it is difficult to do real-life experiments
- Promises to be a valuable tool for emergency response vulnerability assessment, planning, training, and decision support



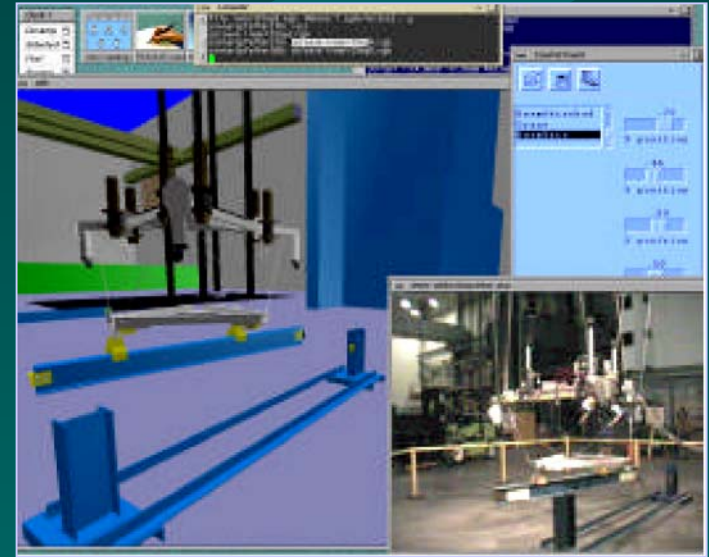
# Why NIST?

- Responsible for the development of standards, measurements, testing capabilities, and representing US interests in the international standards community
- Years of R&D investment in areas related to homeland defense and the first responders' community
- Strong expertise and reputation for a neutral perspective, bringing together diverse communities, and facilitating collaborations
- Technical focus on data standards and protocols that enable information systems to interoperate



# Related Efforts Underway at NIST

- Strengthening structural and fire safety standards
- Improved materials for structures
- Cyber-security standards and technologies
- Enhanced threat detection and protection
- Tools for law enforcement
- Emergency response



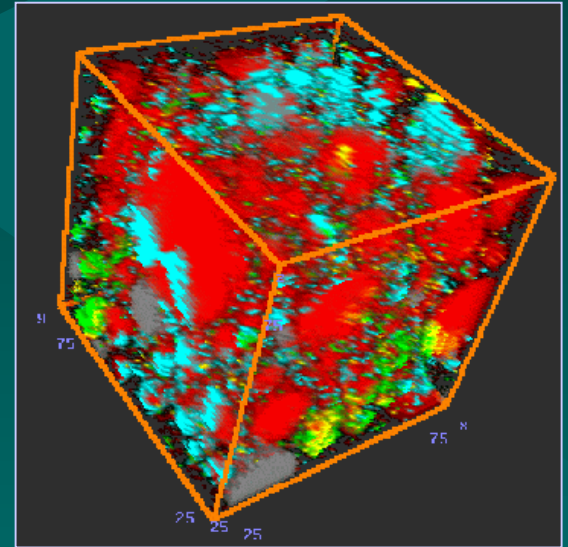
# Strengthening Structural and Fire Safety Standards

- Investigation of World Trade Center buildings' collapse
  - Building and fire safety study
  - Examine structural failure and progressive collapse
  - NIST-developed computational models show impact of building geometry, fuel distribution, wind conditions on smoke and fire flows
- On-site survey of Pentagon structural and fire damage
- Anthrax air flow study, Hart Senate Office Building
- Working toward coordinated national strategy for protecting critical infrastructures



# Improved Materials for Structures

- NIST is helping the engineering and construction industries improve building materials, enabling stronger, longer-lasting structures, including bridges, buildings, or off-shore oil rigs.
  - test methods for high-performance concrete and advanced polymer composites.
  - techniques to characterize the microstructural features of fiber-reinforced polymers and to correlate with material performance.



# Cybersecurity Standards and Technologies

- Increasing reliance on information technology (IT) and systems for communications, monitoring, and control increases risk due to inadequate security
  - NIST helps develop national and international standards for IT security and improve awareness of security solutions
    - cryptographic standards and methods
    - identify the types of vulnerabilities that exist and develop security requirements for the real-time systems that control the power grid and critical industrial production processes



# Enhanced Threat Detection and Protection

- Ensuring proper doses for irradiation of mail
  - Member of White House task force to ensure safety of federal govt. mail
  - Long history of ensuring accurate radiation doses for x-rays, radiopharmaceuticals, etc.
- Weapon detection technologies and standards
  - New performance standards and operational requirements for walk-through, and hand-held metal detectors
- Detection of chemical, biological, radiological and other threats
  - Standards, protocols, and test methods for ultra-sensitive detection and accurate measurement



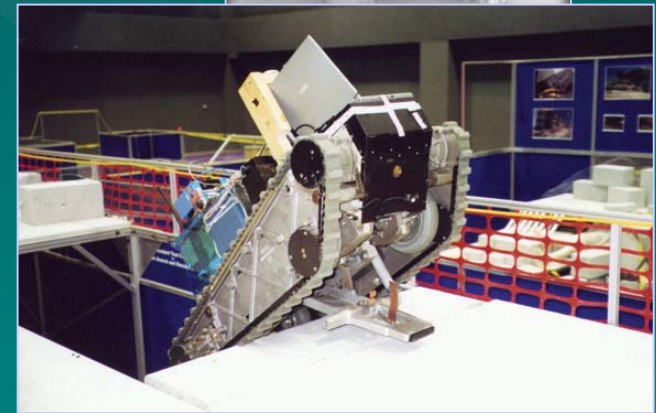
# Tools for Law Enforcement

- Standards for biometrics, e.g., fingerprinting, face recognition
- Standards for forensic DNA typing
- NIST/NIJ standards for protective vests, helmets, shields
- Standards for linking bullets and casings to weapons
- Forensic tools for investigating computer or magnetic data evidence
- Methods for linking residues from pipe bombs or handguns to unfired gunpowder



# Emergency Response

- Protecting first responders
  - Facilitating better national standards for chemical and biological protective gear
- Standardization of communications for first responders
  - Harmonization of wireless and IT applications
- Search and rescue robots
  - Standard, replicable test arena for robot performance
- Simulation tools



# NIST Simulation Strategy

- Experience with projects in manufacturing simulation and visualization
- Strategy for emergency response simulation:
  - identify first responder user needs
  - survey existing tools and relevant standards
  - define an initial framework for integrating tools
  - bring together leading experts from around the nation to help establish a roadmap for moving forward



# Challenge to Workshop Participants

## Help us to identify and/or validate:

- First responder user requirements and scenarios for emergency response simulation
- Simulation tools that already exist
- Programs and projects that are underway or planned
- Data integration requirements and standards needs
- Roadmap or action plan for moving forward collaboratively and leveraging what already exists, including:
  - next steps that result in proposals, program redirections or chartering of new work efforts
  - roadblocks and issues that threaten progress, and
  - initiation of standards activities